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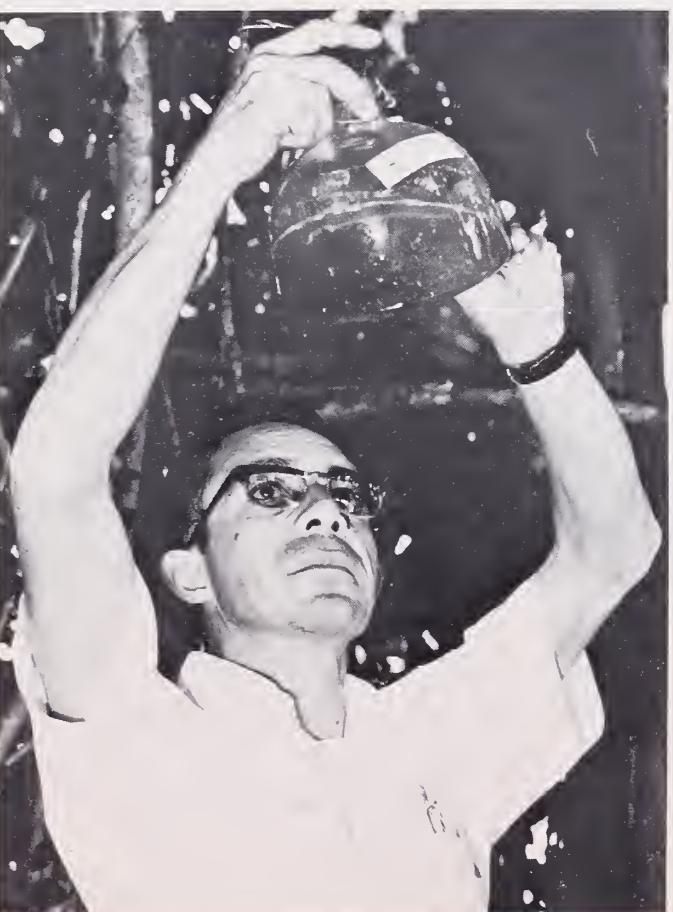
CARIBFLY: Pest Control Plus Environmental Protection



FEDERAL-STATE EXPERIMENTS to develop methods of eradicating an infestation of foreign fruit flies in Florida dramatically illustrate current efforts by agricultural agencies to mix pest control and environmental protection.



COVER--A handful of trouble: Caribflies numbed by cold will cling sluggishly to almost any object until they warm up and become active. Aircraft dropping sterilized fruit flies use airborne refrigeration to keep flies from injuring themselves while packed tightly in the release cages (0271X148-15). LEFT--Experiments involve sterilization with gamma radiation of fruit fly pupae and release of the laboratory-bred flies. Approximately 40,000 pupa are placed in a canister which is lowered into



In December 1970, the U.S. Department of Agriculture's Agricultural Research Service, Florida Department of Agriculture, and University of Florida's Sub-Tropical Experiment Station began cooperative tests of the "sterility technique" as a weapon to control Caribbean fruit flies in the Key West, Fla., area. Laboratory-bred fruit flies are sterilized with gamma radiation, then released in infested areas. No offspring result from matings between sterile and normal insects, thus lowering populations in each succeeding generation. If a large enough sterile-normal ratio can be maintained, the pests should eventually breed themselves out of existence.

The current experiment will continue for approximately 6 months, or until the Key West infestation is eradicated. One million Caribflies are being reared, sterilized, and aerially released each week.

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COVER--A handful of trouble: Caribflies numbed by cold will cling sluggishly to almost any object until they warm up and become active. Aircraft dropping sterilized fruit flies use airborne refrigeration to keep flies from injuring themselves while packed tightly in the release cages (0271X148-15). LEFT--Experiments involve sterilization with gamma radiation of fruit fly pupae and release of the laboratory-bred flies. Approximately 40,000 pupa are placed in a canister which is lowered into

the unit and exposed to Cobalt-60 (0271X148-6). LEFT CENTER--After irradiation, pupae are covered with a thin layer of granular material that has been treated with a fluorescent dye. When adult flies hatch and dig their way to the surface, they mark themselves for easy identification (0271X148-3). LOWER LEFT--Scientists check traps daily in areas where sterile flies have been released. The ratio of trapped fluorescent, sterile flies to normal flies indicates the effectiveness

of the program; if a high enough sterile-normal ratio is being maintained; and the size of the wild fruit fly population (0271X148-7). BELOW--One experiment involved developing techniques for "free dropping" sterilized insects without protective packaging--a past practice that resulted in littering. Flies dropped during the anti-littering test onto huge plastic sheets that provided a target for pilots (0271X148-8).



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with the absolute minimum, use of pesticides. ARS scientists hope it will fulfill the need for a Caribfly control method that will be effective without harming the wide variety of infested environments in Florida: metropolitan centers such as Miami, valuable citrus groves, the unique water world of the Florida Keys, and exotic wildlife and tropical plants in the Everglades.

One far-reaching phase of the Caribfly experiments involves ARS research aimed at stopping "littering" by aircraft used in this and similar projects. The usual procedure for the aerial release of sterilized insects calls for their packaging in paper boxes. The boxes open in mid-air after protecting soft-bodied insects from the initial impact of being ejected in an aircraft's slip-stream.

ARS recently developed new equipment and techniques for dropping insects directly into the air without any type of protective packaging, thus reducing costs and negating the need for bombarding infested areas with paper. During earlier

Caribfly experiments, ARS scientists conducted drop tests at Homestead General Aviation Airport, Fla., with groups of treated fruit flies being released at various air speeds and low altitudes onto huge plastic sheets. The insects had been numbed with airborne refrigeration units and were collected before they warmed up and flew away. Comparison of injuries and mortality among the different groups told the scientists which was the best air speed for "free release" of treated insects.

Florida's current Caribfly infestation has existed for more than 5 years. The pests were largely ignored initially because they were damaging only "dooryard" fruit such as guava, Surinam cherries, and loquats. There have been indications recently, however, that the Caribfly is becoming adapted to Florida citrus. Another real danger is the possibility of spread into northern Florida and Georgia where the pests could cause great losses to commercial peach orchards.

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Researchers collect insects which have been dropped by aircraft onto huge plastic sheets. By studying the insects, scientists learned which air speeds cause the least damage to treated flies when they are dropped without any protective packaging (0271X148-9).

